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S/244/62/021/001/001/004  
1016/1216

*Author:* Karkalitskiy, I. M. (Moscow)

*Title:* PROPHYLAXIS OF PARTIAL HYPOVITAMINOSIS-D IN PEOPLE LIVING IN  
ARCTIC REGIONS DURING THE POLAR NIGHT

*Periodical:* Voprosy pitaniya, v. 21, no. 1, 1962, 45-48

*Text:* Due to the severe winter and long polar night vitamin D synthesis in the organism is very low. The purpose of this study was to investigate the effect of the duration of stay in the Arctic Regions on the vitamin D levels and to find effective prophylactic measures for the prevention of vitamin D deficiency. The blood levels of alkaline phosphatase were measured, since this enzyme is related to the metabolism of vitamin D. Alkaline phosphatase was elevated in persons living in the Arctic Regions, being directly proportional to the length of stay in the area. Following administration of vitamin D alkaline phosphatase activity decreased from 22.1 to 19.4 units. UV-irradiation combined with vitamin D treatment reduced the level of alkaline phosphatase in the blood from 22.1 to 16 units.

*Submitted:* August 8, 1960

Card 1/1

KARKAN, A.

Country : CZECHOSLOVAKIA  
 Category : Farm Animals.  
 General Problems. Q-1  
 Abs. Jour : Ref Zhur-Biol., No 16, 1956, 73900  
 Author : Karkan, Alois  
 Institut. :  
 Title : Procedures of Siloing Corn.  
 Orig. Pub. : Mas chov, 1957, No 17, 467-469  
 Abstract : Procedures and techniques of siloing are described: of the corn's green mass for cattle, of corn ears at the stage of "milky" ripeness for piglets and poultry (a number of variations), and of corn straw. -- G. A. Pitov

Card: 1/1

KARKAN, Z.

"Various methods of producing lintels from the viewpoint of mechanization and economy." p. 220.

STAVIVO. (MINISTERSTVO STAVEBNICTVI). Praha, Czechoslovakia, Vol. 37, no. 7,  
July 1959.

Monthly List of East European Accessions (EEAI), LC, Vol. 8, No. 9, September 1959.  
Uncl.

KARKAN, Z.

Quality measurement in producing prefabricated elements and  
precision measurement in assembling them. Stavivo 41 no.8:  
274-275 Ag'63

For higher quality of prefabricated building elements.  
Ibid:275-276

1. Jihomoravska Prefa, n.p., Brno.

KARKANITSA, N.

Only forward. Sev. shakh. 11 no.10:9-11 0 '62. (MIRA 15:9)

1. Rukovoditel' skvoznoy kompleksnoy brigady shakhty  
kommunisticheskogo truda No.3 "Velikomostovskaya" L'vovskoy  
oblasti.

(Lvov-Volyn' Basin--Coal mines and mining)

KARKARASHVILI, M.

GOGORISHVILI, P.; KARKARASHVILI, M.

Using kerosene for extracting bromine from solutions  
[in Georgian with summary in Russian]. Trudy Inst.  
khim. AN Gruz. SSR 11:87-99 '53.

(MLRA 10:2)

(Kerosene) (Bromine)

~~GO~~ KARKARASHVILI, M.

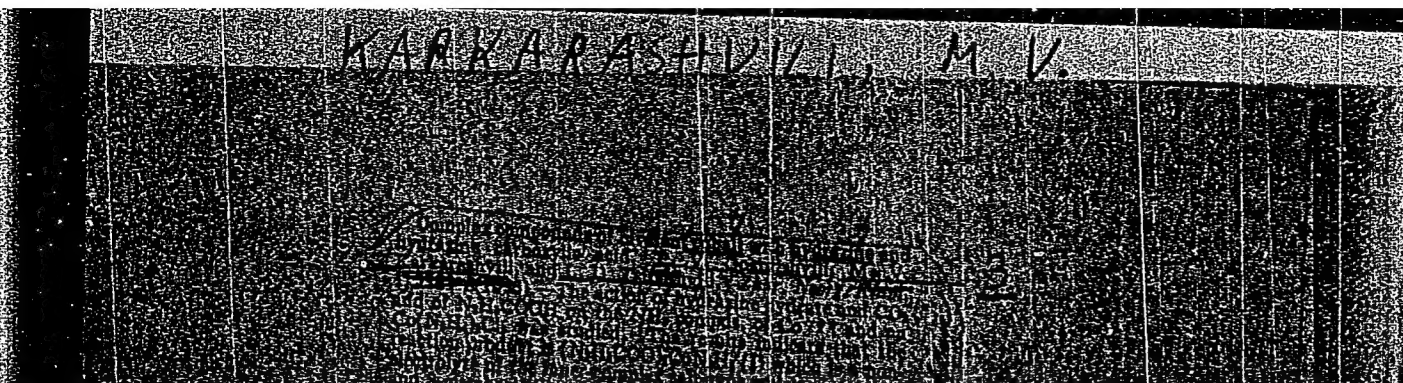
✓ Extraction of bromine from solutions with kerosine.  
P. Gogelashvili and M. Karkarashvili. *Trudy Inst. Khim.*  
*Adm. Nauch. Gruzin. S.S.R.* 11, 81-99 (1953); *Referat.*  
*Zhur., Khim.* 1954, No. 50337. Expts. with 200-230 and  
230-250° fractions confirmed previous data that used kero-  
sine is more effective in extg. Br than fresh kerosine (cf.  
Pautchimonov, C.A. 22, 4731. Curves giving the relation  
between the amt. of Br extd. and the duration of shaking  
show that the longer the shaking the greater the loss of Br  
because the latter combines with the kerosine. This inter-  
action is enhanced by temp. and ultraviolet radiation. To  
reduce the losses of Br it should be removed from the kero-  
sine soln. immediately. M. Hosh

①

PM

CuO or MnO<sub>2</sub> in acid medium.

Card 1/1



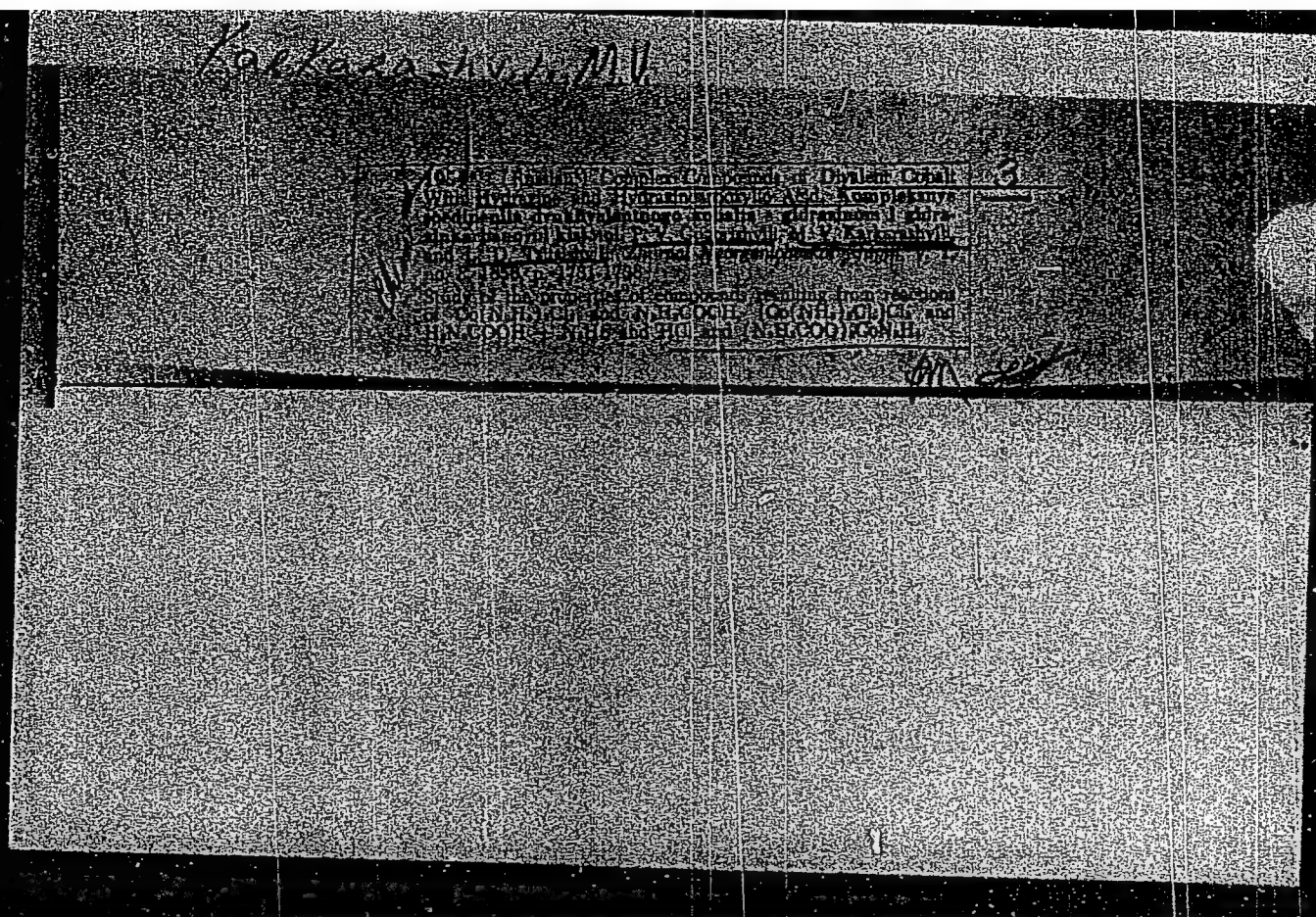


Dr. Inorganic Chem.  
Inst. Chemistry in P.G. Dzhirskaya, A.S. Geo SSR

7  
The action of hydrazine on cobalt(II) complexes in the presence of carbon dioxide. V. V. Ginzburg, M. V. Kerkurashvili, and L. O. Tskhakvili. *Zhur. Neorg. Khim.* 1978, 23(1986). The action of hydrated hydrazine and CO on  $\text{Co}(\text{NH}_3)_4\text{Cl}_2$ ,  $[\text{Co}(\text{NH}_3)_4\text{CO}]\text{NO}_2$ , and  $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$  was studied. It was shown that the inner complex  $[\text{Co}(\text{NH}_3)_4\text{CO}]^{2+}$  (I) was formed. If I is treated with 1-2 moles of HCl leads to the splitting off of the hydrazonium ions to yield  $[\text{Co}(\text{NH}_3)_4\text{CO}]^{2+} \cdot 2\text{H}_2\text{O}$  in the cold and  $[\text{Co}(\text{NH}_3)_4\text{CO}]^{2+}$  Co upon heating. The action of an excess of HCl on I ruptures the rings, decomposes the hydrazine carboxylic acid radicals, and leads to the formation of hydrazine. The structure of I was discussed and it was shown that the acid radicals form a 5-membered ring with Co and the hydrazonium ions occupy a single coordination position.

J. Rovin Leach

PM Jan 1978  
Inst. Chemistry, P. F. Melikishvili, AS Geo SSR



KAR KARASHVILI, M. V.

AUTHORS: Gogorishvili, P. V., Tsitsishvili, L. D. and 78-3-7/35  
Karkarashvili, M. V.

TITLE: The Action of Hydrazine on Dinitrotetraminocobaltini-  
nitrate in the Presence of Carbon Dioxide. (O Deystvii  
Gidrazina na Dinitrotetraminkobal'tinitrat v Prisutstvii  
Ugloksislogo Gaza)

PERIODICAL: Zhurnal Neorganicheskoy Khimii, 1957, Vol. II, Nr. 3,  
pp. 532-535. (USSR)

ABSTRACT: This investigation, a report of which was presented at  
the VII All-Union Conference on the chemistry of complex  
compounds, October 9-13, 1956, is a continuation of  
previously reported work. The action of hydrazine  
hydrate and carbon dioxide on the cis- and trans-isomers  
of dinitrotetraminocobaltinitrate was studied. Under  
the conditions pertaining in the experiments an internal  
complex compound  $(N_2H_3COO)_2Co(N_2H_4)_2$  was obtained. It  
has been shown that the action of 1 or 2 mol HCl on 1 mol  
of the compound being studied leads to the splitting of  
both molecules of hydrazine and the formation of

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The Action of Hydrazine on Dinitrotetraminocobaltinitrate  
in the Presence of Carbon Dioxide.

78-3-7/35

$(N_2H_3COO)_2Co \cdot 2H_2O$  at room temperature and of  $(N_2H_3COO)_2Co$  on heating. With 3 to 4 mol HCl, however, the rings open,  $N_2H_3COO$  is destroyed and cobalt hydrazinates are formed. It was also shown that radicals of the inorganic addend of hydrazinecarboxylic acid in  $(N_2H_3COO)_2Co(N_2H_4)_2$  close five-membered rings with cobalt, while the hydrazine molecules occupy one co-ordination point each. As in the authors' previous investigations<sup>1,2</sup> it was found that the hydrazinecarboxylic acid was stabilized in the above compounds, although it is unstable even in aqueous solution; this is evidently due to the closing of the five-membered ring by the hydrazinecarboxylic radical and bivalent cobalt. There is 1 figure and 5 references, 4 of which are Slavic.

Card 2/3

The Action of Hydrazine on Dinitrotetraminocobaltinitrate  
in the Presence of Carbon Dioxide.

78-3-7/35

ASSOCIATION: The Chemical Institute imeni P. G. Melikishvili  
of the Academy of Sciences of the Gruzinskaya S.S.R.,  
The Inorganic Chemistry Laboratory. (Institut Khimii  
im. P. G. Melikishvili Akademii nauk Gruzinskoy S.S.R.  
Laboratoriya Neorganicheskoy Khimii.)

SUBMITTED: October 27, 1956.

AVAILABLE: Library of Congress.

Card 3/3

GOGORISHVILI, P.V.; TSITSISHVILI, L.D.; ~~KARKARASHVILI, M.V.~~

Compounds of trivalent cobalt with hydrazine. Zhur. neorg. khim.  
2 no.5:1040-1045 My '57. (MLRA 10:8)

1. Institut khimii imeni P.G. Melikishvili Akademii nauk Gruzinskoy  
SSR, laboratoriya neorganicheskoy khimii.  
(Cobalt) (Hydrazine) (Complex compounds)

GOGORISHVILI, P.V.; KARKARASHVILI, M.V.

Preparation of diamminocobalt (II) sulfite. Trudy Inst.khim.  
AN Gruz.SSR 14:19-21, '58. (MIRA 13:4)  
(Cobalt compounds)



KARKARASHVILI

46

PHASE I BOOK EXPLOITATION

SOV/6195

Nauchnaya konferentsiya institutov khimii Akademiy nauk Azerbaydshanskoy, Armyanskoy i Gruzinskoy SSR. Yerevan, 1957.

Materialy nauchnoy konferentsii institutov khimii Akademiy nauk Azerbaydzhanskoy, Armyanskoy i Gruzinskoy SSR (Materials of the Scientific Conference of the Chemical Institutes of the Academies of Sciences of the Azerbaydzhani, Armenian, and Georgian SSR) Yerevan, Izd-vo AN Armyanskoy SSR, 1962. 396 p. 1100 copies printed.

Sponsoring Agency: Akademiya nauk Armyanskoy SSR. Institut organicheskoy khimii.

Resp. Ed.: L. Ye. Ter-Minasyan; Ed. of Publishing House: A. G. Slikuni; Tech. Ed.: G. S. Sarkisyan.

PURPOSE: This book is intended for chemists and chemical engineers, and may be useful to graduate students engaged in chemical research.

COVERAGE: The book contains the results of research in physical, inorganic, organic, and analytical chemistry, and in chemical engineering, presented at the Scientific Conference held in Yerevan, 20 through 23 November 1957. Three reports of particular interest are reviewed below. No personalities are mentioned. References accompany individual articles.

Materials of Scientific Conference (Cont.) SOV/6195

Abramyan, A. V. The Effect of Oxidation and Reduction Processes on the Fusion and Recrystallization of Basalt 109

Gogorishvili, P. V., and M. V. Karkarashvili. Diamine Sulfite Complex Compounds of Divalent Cobalt 132

Darbinyan, M. V. Hydrometallurgical Autoclave Treatment of Oxide and Sulfide Molybdenum Ores 138

Burnázyan, A. S., and M. V. Darbinyan. Aluminum Carbide as Reducing Agent in the Production of Metallic Calcium 154

ORGANIC CHEMISTRY

Babayan, A. T. Investigation of Ammonia Compounds 170

Zeynalov, B. K. Oxidation of Paraffinic Distillate and Normal Hexadecane in the Presence of Chlorine and Nitrogen Dioxide 177

Card 4/11

2/2

KARKARASHVILI, M. V.

JUN 25 1963

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PHASE I BOOK EXPLOITATION

SOV/6195

Nauchnaya konferentsiya institutov khimii Akademiy nauk Azerbaydzhanskoy, Armyanskoy i Gruzinskoy SSR. Yerevan, 1957.

Materialy nauchnoy konferentsii institutov khimii Akademiy nauk Azerbaydzhanskoy, Armyanskoy i Gruzinskoy SSR (Materials of the Scientific Conference of the Chemical Institutes of the Academies of Sciences of the Azerbaydzhani, Armenian, and Georgian SSR) Yerevan, Izd-vo AN Armyanskoy SSR, 1962. 396 p. 1100 copies printed.

Sponsoring Agency: Akademiya nauk Armyanskoy SSR. Institut organicheskoy khimii.

Resp. Ed.: L. Ye. Ter-Minasyan; Ed. of Publishing House: A. G. Sikuni; Tech. Ed.: G. S. Sarkisyan.

PURPOSE: This book is intended for chemists and chemical engineers, and may be useful to graduate students engaged in chemical research.

Card 1/11

Materials of the Scientific Conference (Cont.)

SOV/6195

COVERAGE: The book contains the results of research in physical, inorganic, organic, and analytical chemistry, and in chemical engineering, presented at the Scientific Conference held in Yerevan, 20 through 23 November 1957. Three reports of particular interest are reviewed below. No personalities are mentioned. References accompany individual articles.

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Materials of Scientific Conference (Cont.)

SOV/6195

- Abramyan, A. V. The Effect of Oxidation and Reduction Processes on the Fusion and Recrystallization of Basalt 109
- Gogorishvili, P. V., and M. V. Karkarashvili. Diamine Sulfite Complex Compounds of Divalent Cobalt 132
- Darbinyan, M. V. Hydrometallurgical Autoclave Treatment of Oxide and Sulfide Molybdenum Ores 138
- Burnazyan, A. S., and M. V. Darbinyan. Aluminum Carbide as as Reducing Agent in the Production of Metallic Calcium 154

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- Babayan, A. T. Investigation of Ammonia Compounds 170
- Zeynalov, B. K. Oxidation of Paraffinic Distillate and Normal Hexadecane in the Presence of Chlorine and Nitrogen Dioxide 177

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GOGORISHVILI, P.V.; KARKARASHVILI, M.V.; TSITSISHVILI, L.D.;  
TSISKARISHVILI, P.D., red.

[Oil field brines of Georgia] Burovye vody neftiannykh  
mestorozhdenii Gruzii. Tbilis, Metsniereba, 1964. 121 p.  
(MIRA 18:7)

GOGORISHVILI, P.V.; KAREKASHVILI, M.V.

Hydrazine carboethylenediamine compounds of cobalt.  
Zhur.neorg.khim. 10 no.12:2664-2669 D '65.

(MIRA 1961)

1. Institut khimii imeni Melikishvili, laboratoriya neorganicheskoy khimii.

KARKARIN, A. (g.Stepnyak Kokchetavskoy oblasti, srednyaya shkola No.1)

How to make a rake. Politekh.obuch. no.5:86 My '59.  
(MIRA 12:7)

(Agricultural implements)



N. D. KARKASHEV

8/5

753.4

.R1

1954

Eksploatatsiya Lineynno-kabel'nogo Khozyaystva (The Operation of Linear Cable Establishments  
By) BORIS NIKOLAYEVICH LAMENSKIY, N. V. LUSKINOVICH I N. D. Karkashev. 2., isprav. 1 Dop.  
Izd. Moskva, Svyazizdat, 1954.  
157 P. illus., Diagrams, Tables.  
Literatura: P. 196.

KRASIK, L.B.; YEGOROVA, A.I.; GEYKHMAN, K.P.; SKOROSPESHKINA, M.I.;  
KARKASHEVA, A.R.; PAREKHA, A.A.; GUZHAVINA, E.V.;  
STEPANOVA, N.I.

Physical development of pupils in the boarding schools of  
Perm (according to examination data of 1962). Zdrav. Ros.  
Feder. 7 no.6:22-26 Je '63. (MIRA 17:1)

1. Iz kafedry pediatrii (zav. ~ dotsent L.B. Krasik)  
Permskogo meditsinskogo instituta (rektor - dotsent T.V.  
Ivanovskaya).

VALETOV, V.V.; VESNIK, M.I.; GONCHAROV, I.S.; DMITROV, D.V.; LUNEV, A.A.;  
MOKIN, M.I.; NESTEROV, S.N.; SMIRNOV, V.P.; ALEKSEYEV, S.A., re-  
tsenzent; KARKAZOV, A.G., retsenzent; KONDRATOVICH, V.M., retsen-  
zent; LEVIN, B.M., retsenzent; MALIKOV, A.N., retsenzent; SEGAL-  
VICH, S.M., retsenzent; SHPAGIN, A.I., retsenzent; SHTERN, L.T.,  
retsenzent; YAKOBI, A.A., retsenzent; TIKHANOV, A.Ya., tekhn. red.;  
CHERNOVA, Z.I., tekhn. red.

[Establishing norms for the consumption of materials in machinery  
manufacture; manual] Normirovanie raskhoda materialov v mashino-  
stroenii; spravochnik. Pod red. V.V.Valetova. Moskva, Gos. nauchno-  
tekhn. izd-vo mashinostroit. lit-ry. Vol.1. 1961. 583 p.  
(Machinery industry) (MIRA 15:2)

KARKER, Ya. I.; KOGAN, M. G.

Induction heating apparatus designed by NITI and the forging and  
stamping sections of shops using induction heating. [Isdaniia]  
LONITOMASH no. 30:151-161 '52. (MLRA 8:1)  
(Induction heating) (Forging machinery)

KARKER, Ya.I.

AUTHORS: Karker, Ya.I., Engineer and Kogan, M.G., Candidate of Technical Sciences. 129-1-11/14

TITLE: Grain Growth and Decarburisation of the Surface Layers during Induction-Heating of Steel Blanks (Rost Zerna i obezuglerozhivaniye poverkhnostnykh sloyev pri induktsionnom nagreve stal'nykh zagotovok)

PERIODICAL: Metallovedeniye i Obrabotka Metallov, 1958, No.1, pp. 46 - 49 (USSR)

ABSTRACT: The authors carried out experiments in the forging shops of two engineering works which were fitted with induction furnaces [Ref.2]. The blanks were made of the steel 40XHMA and steel 50 and were heated to 1 100, 1 200 and 1 300 °C. The grain growth and the degree of decarburisation of the surface layer were judged from the micro-structures. The results of heating of blanks from the steel 40XHMA in induction furnaces and in chamber furnaces to practically the same temperatures are compared. Micro-photographs are reproduced, showing the surface layer of the steel 40XHMA after rolling, after stamping and heating to 1 100 °C by induction and in a flame furnace (Fig.2), after heating to 1 100 °C followed by turning (Figs. 3, 5 and 6). On the basis of the obtained

Card 1/2

ACC NR: AP7001703

SOURCE CODE: UR/0032/66/032/012/1523/1525

AUTHOR: Kogan, M. G.; Andreychenko, I. T.; Bogin, V. S.; Zavartsev, N. A.;  
Karker, Ya. I.

ORG: none

TITLE: Laboratory high-temperature furnace for heating and melting of metals

SOURCE: Zavodskaya laboratoriya, v. 32, no. 12, 1966, 1523-1525

TOPIC TAGS: metalluric research, metallurgic furnace, high temperature furnace,  
electron beam furnace

ABSTRACT: A laboratory vacuum furnace for heating, melting, zone refining, and evaporating (for vacuum-vapor deposition) primarily refractory metals has been designed and built at an unidentified institution. The furnace operates with several heating systems (resistance, radiation, arc, and electron beam) used individually or in combination. The vacuum chamber can be evacuated to a pressure of  $10^{-6}$  mm Hg. The furnace produces ingots 50 mm in diameter and up to 400 mm long. The charge can be placed in advance or fed during the melting. Zone refining can be done with a metal bar in the horizontal or vertical position. In vacuum-vapor deposition, the evaporation is done with an electron beam, and the temperature of the substrate is controlled with radiant heat. The furnace has two 45-kw electron guns operating with an accelerating voltage of 30 kv. Orig. art. has: 1 figure.

SUB CODE: 13/ SUBM DATE: none/ ATD PRESS: 5111

Card 1/1

UDC: 621.365:621.52:546.3

L 29425-66 EWT(m)/ETC(f)/EVP(t)/ETI IJP(c) JD/JG

ACC NR: AP6017978

(N)

SOURCE CODE: UR/0413/66/000/010/0080/0080

INVENTOR: Kogan, M. G.; Andreychenko, I. T.; Karker, Ya. I.; Bogin, V. S.;  
Zavartsev, N. A.

ORG: none

TITLE: A method of vacuum melting highly reactive refractory metals. Class 40,  
No. 181813

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 10, 1966, 80

TOPIC TAGS: metal, reactive metal, refractory metal, metal melting, vacuum melting,  
induction melting

ABSTRACT: This Author Certificate introduces a method of vacuum scull melting of  
highly reactive refractory metals. To obtain uniformly superheated metal within  
the scull, the initial metal or alloy is melted in an electromagnetic field with  
the heat produced by axial or eddy currents.

[MS]

SUB CODE: 11/ SUBM DATE: 06Jun63/ ATD PRESS: 5010  
13/

Card

1/1 *fr*

UDC: 621.745.5

KARKESZ, Sandor; SZITTYA, Otto

Investigation of throttle valves. Gep 12 no.1:9-16 Ja '60



USSR/Physics - Luminescence, Infrared Jan/Feb 52

"Luminescence Spectrum of Cuprous Oxide," Yu. I. Karkhanin, Kiev State U imeni T. G. Shevchenko

"Iz Ak Nauk SSSR, Ser Fiz" Vol XVI, No 1, pp 108,109

In 1946 V. Ye. Lashkarev and K. M. Kosonogova discovered the infrared luminescence of cuprous oxide ("Dok Ak Nauk SSSR" Vol LIV, 125, 1946). Author studied the dependence of relative quantum output of luminescence on the wave length of exciting light and the spectrum of luminescence of cuprous oxide at room temp. He found in agreement with

218791

USSR/Physics - Luminescence, Infrared Jan/Feb 52  
(Contd)

S. I. Vavilov ("Iz Ak Nauk SSSR, Ser Fiz" 7, 3, 1943) that the luminescence spectrum is independent of the wave length of the exciting light.

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KARKHANIN, Yu. I.

KARKHANIN, Yu. I.

V. The nature of luminescence of cuprous oxide. Yu. I. Karkhanin and V. B. Lashkarev (T. G. Shevchenko State Univ., Kiev). *Doklady Akad. Nauk S.S.S.R.* 97, 1007-10 (1954); cf. C.A. 46, 9428j. Exptl. data are analyzed, several possible causes of luminescence (I) of  $\text{Cu}_2\text{O}$  are eliminated as untenable, and the following postulate is accepted as the most plausible: There are "Cu ion vacancies" (II) in  $\text{Cu}_2\text{O}$ ; these are frequently ascribed to impurities or an excess of O. The reaction of an exciton with II, which are assoc. with donor levels and are free of electrons, produces I. The exptl. fact that I rises smoothly and continuously simultaneously with a decrease in the hole concn. as the cooling temp. is lowered (to  $-183^\circ$ ) supports this concept. Photocond. as well as I can be explained by the existence of II without resorting to the postulate of collisions of excitons with acceptor levels occupied by electrons (cf. Zhurav and Rhokin, C.A. 45, 10068j), or to the theory that excitons disoc. into electrons and a hole (cf. Dykman and Pekur, C.A. 45, 8508b). The following exptl. facts support the conclusion: (a) The elec. conductance of  $\text{Cu}_2\text{O}$ , caused by heat waves filling II, is affected by annealing the  $\text{Cu}_2\text{O}$  specimen at different temps. in atm. of different O concns.; the sp. conductance  $\sigma$  is decreased as the annealing temp. rises. I is lowered several times as  $\sigma$  is reduced from  $10^{-4}$  to  $2 \times 10^{-4}$  ohm $^{-1}$  cm $^{-1}$ . (b)  $\text{Cu}_2\text{O}$  specimen with a very low  $\sigma$  exhibits a sharp drop in I and in photocond. (c) Photoelectrons as a possible cause of I are eliminated because experimentally I is not affected when the electrons are instantaneously removed from the  $\text{Cu}_2\text{O}$  by an elec. field applied through a semitransparent metal plate (cf. C.A. 44, 4778k). J. Benicowitz

KARKHANIN, YU. I.

KARKHANIN, YU. I. - "Investigation of Luminescence of Cuprous Oxide." Min. of Higher Education USSR, Kiev State U imeni T. G. Shevchenko, Kiev, 1955 (Dissertations for the Degree of Candidate of Physicomathematical Sciences)

SO: Knizhnaya Letopis' No. 26, June 1955, Moscow

KARKHANIN, Yu.I.

Simple demonstration of vibrations. Nauk zap.Kyiv.un.  
14 no.8:231-232 '55.

(MLRA 9:10)

(Tuning forks)

*Karkhanin, Yu. I.*

USSR/Optics - Physical Optics.

K-5

Abs Jour : Referat Zhur - Fizika, No 5, 1957, 12889

Author : Lashkarev, V.Ye., Karkhanin, Yu.I.

Inst : -

Title : Length of the Diffusion Displacement of the Excitons in Cuprous Oxide.

Orig Pub : Dokl. AN SSSR, 1955, 101, No 5, 829-832

Abstract : An investigation was made of the diffusion tendency of excitons due to luminescence of cuprous oxide. The authors have started with the assumption that if the excitations are mobile and if conditions are created on the surface of the cuprous oxide specimen for their radiationless annihilation, then the luminescence turns out to be attenuated. The greater the coefficient of absorption  $k$  of the excited light, the greater the attenuation. The state of the surface of the cuprous oxide was varied by means of thin films of liquids, such as water, dehydrated alcohol, acetone,

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*Kiev State U. in T. G. Shevchenko.*

Abs Jour : Ref Zhur - Fizika, No 5, 1957, 12889

APPROVED FOR RELEASE: 06/13/2000

CIA-RDP86-00513R000720720013-9"

and benzol. An investigation was made with specimens of cuprous oxide, for which, in the 0.4 -- 0.6 micron region, the luminescence yield was independent on the  $\lambda_E$  of the exciting light. The influence of the adsorbed liquid is characterized by the quantity  $C = I_a(\lambda)/I_0(\lambda)$ , where  $I_a(\lambda)$  and  $I_0(\lambda)$  are the intensities of luminescence in the presence and the absence of liquid respectively. For all liquids, in the region 0.6 -- 0.73  $\mu$ ,  $C$  is independent of  $\lambda_E$  and is close to unity. When  $\lambda_E < 0.6$  microns,  $C$  is constant for all liquids with the exception of water, which gives a clearly pronounced reversible effect of reduction of luminescence with diminishing  $\lambda_E$ : viz: at  $\lambda_E = 0.43$  microns,  $C$  is 3 -- 5 times smaller than the value at  $\lambda_E = 0.6$  microns. Mixtures of water with alcohol or acetone give intermediate values of  $C$ . The diffusion length of the excitation is calculated from the dependence of  $C$  on  $\lambda_E$  and from the previously-

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· ; USSR/Optics - Physical Optics.

K-5

Abs Jour : Ref Zhur - Fizika, No 5, 1957, 12889

-determined dependence of  $k$  on  $\lambda_E$  (Lashkarev, V.Ye.,  
Kosonogova, K.M., Zh eksperim i teor fiziki, 1948, 18,  
19, 962) to be approximately  $10^{-4}$  cm.

Card 3/3

KAR KHANDIN, Yu. I.

24(4) PHASE I BOOK REVIEWER SOV/3140  
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Fotoelektricheskiye i opticheskiye yavleniya v poluprovodnikakh  
trudy pervogo vostochnogo sovetskogo po fotoelektricheskimi  
i opticheskim yavleniyam v poluprovodnikakh, K. Kiyev, 1959, 202  
noyabrya 1959, K. (Photoelectric and optical phenomena in semi-  
conductors) Translations of the Ukrainian Academy of Sciences  
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of Sciences.

PURPOSE: This book is intended for scientists in the field of semi-  
conductor physics, solid state spectroscopy, and semiconductor  
devices. The collection will be useful to advanced students in  
universities and institutions of higher technical training  
specializing in the physics and technical application of semi-  
conductors.

COVERAGE: The collection contains reports and information bulletins  
(the latter are indicated by asterisks) read at the First All-  
Union Conference on Optical and Photoelectric Phenomena in Semi-  
conductors. A wide scope of problems in semiconductor physics  
and technology are considered: photoconductivity, photoelectro-  
motive forces, optical properties, photoelectricity, photoelectro-  
photoreceptors, the actions of infrared and ultraviolet radiations,  
the properties of thin films, complex semiconductor systems,  
etc. The articles were prepared for publication by E. I.  
Kashchuk, O. V. Anisimov, K. B. Tolpygo, A. P. Lubchenko, and M. K.  
Stepanov. References and discussion follow each article.

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KARKHANIN, Yu. I.; KOZHEVIN, V. Ye. [Kozhevin, V. IE.]; PEKA, G. P. [Peka, H. P.].

Effect of organic dyes on the condenser photoeffect of cuprous oxide and germanium. Ukr. fiz. zhur. 5 no. 6: 809-815 N-D '60.  
(MIRA 14:3)

1. Kiyevskiy ordena Lenina gosudarstvennyy universitet im. T. G. Shevchenko.

(Germanium)  
(Copper oxide) (Photoelectricity)



89289

S/181/61/003/001/028/042  
B102/B204

9.4/60 (also 1137, 1395)

AUTHORS: Vorob'yev, Yu. V. and Karkhanin, Yu. I.

TITLE: Infrared luminescence of the surface layer of cuprous oxide

PERIODICAL: Fizika tverdogo tela, v. 3, no. 1, 1961, 206-211

TEXT: Karkhanin, together with others, carried out various studies on luminescent  $\text{Cu}_2\text{O}$ , and reported on these investigations in earlier paper (Refs. 1,2). An investigation of the effect of electrolytes upon  $\text{Cu}_2\text{O}$  luminescence showed that the extinction of luminescence is related to the presence of positive ions on the  $\text{Cu}_2\text{O}$  surface. The opinion was expressed that the cations increase the blocking inflection of the bands in the surface layer of the semiconductor; here, the number of neutral acceptor centers decreases, and thus also the exciton annihilation probability. For specimens with a small screening depth, the diffusion length of an exciton was calculated as being  $l_D \approx 5\mu$ . It could also be shown that an external electric field may produce a considerable effect

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upon the extinguishing effect of the electrolyte. In continuation of these studies, the dependence of the intensity of the luminescence of  $\text{Cu}_2\text{O}$  upon a potential difference applied to the system cuprous oxide - electrolyte was studied, and a report is given in the present paper. Fig. 1 schematically shows the optical arrangement of experiments. The light from source S (100 w) was made parallel in the capacitor lens I, fell through a filter M (80 mm, concentrated Mohr salt solution), an interference filter  $\text{H}\bar{\Phi}$ , which monochromatized the light (filters with  $\lambda_{\text{max}} = 442.2, 471.2, \text{ and } 483.9 \text{ m}\mu$  were used), and was directed onto the specimen by means of lens II and prism  $\text{II}$  so that it hit the interface electrolyte -  $\text{Cu}_2\text{O}$  from below through the electrolyte. As receiver of the infrared emission of  $\text{Cu}_2\text{O}$ , a multiplier of the type  $\bar{\Phi}\bar{\Psi}$ -22 (FEU-22) was used; a galvanometer of the type M-21 (M-21) was inserted into the anode circuit of the FEU-22 photomultiplier. Between specimen and FEU-22 there was an ebonite filter  $\bar{\Phi}$ . Fig. 2 shows the arrangement of specimen and electrolyte. Measurements were carried out in the following manner: First, the luminescence of dry  $\text{Cu}_2\text{O}$  was measured, and also the

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capacitor photoeffect. Next, the specimen was put into the holder (Fig. 2), and luminescence was measured at various voltages applied to  $\text{Cu}_2\text{O}$  and Pt.

From the preliminary investigations it had already been known that  $\text{Na}_2\text{CO}_3$  and  $\text{Na}_2\text{SO}_4$  have a considerable extinguishing power,  $\text{NaCl}$  and  $\text{KCl}$ , however, hardly at all. The experiments described were carried out with  $\text{Na}_2\text{CO}_3$  and  $\text{NaCl}$ . The dependence of the luminescence intensity on the external voltage was found to differ for the two electrolytes. Whereas in  $\text{Na}_2\text{CO}_3$ , at about 2.5 v, the intensity decrease becomes less with increasing voltage, a jump-like intensity drop occurs in  $\text{NaCl}$  at about 2.5 v. [Abstractor's note: The present paper shows curves for specimens nos. 1-A-1, 1-A-16, and 1-A-17, it is not said in what these specimens differ]. The luminescence intensity decreases if  $\text{Cu}_2\text{O}$  is connected as a cathode; if  $\text{Cu}_2\text{O}$  is the anode, extinction decreases if  $\text{Na}_2\text{CO}_3$  serves as an electrolyte, it remains unchanged if  $\text{NaCl}$  is used. Measurements with an alternating-current bridge showed that the  $\text{Cu}_2\text{O}$  electrode has a capacity of 0.005  $\mu\text{f}/\text{cm}^2$ . Experiment-

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tal results indicate that the energy band boundaries on the semiconductor surface in the blocking direction are practically shifted by the amount of the applied external voltage. Here it is assumed that the possible gap between  $\text{Cu}_2\text{O}$  and electrolyte is essentially smaller than the screening

depth  $l_e$  ( $\approx 5\mu$ ). On the assumption that the band curvature is low,  $W$  may be put equal to  $W_0 e^{-\kappa x}$ , and for the intensity of luminescence,

$$I_1 = \beta \int_0^{\infty} n(x) m_{\infty} dx - \beta \int_0^{\infty} n(x) m_{\infty} W_0 e^{-\kappa x} dx - \beta \int_0^{\infty} n(x) m_{\infty} (W_0^2/2) e^{-2\kappa x} dx - \dots$$

$= I_0 - I_1 W_0 / C - I_2 (W_0^2/2)$  is obtained, where  $I_0 = \beta (A/Dp^2) m_{\infty}$ ,  $\kappa = 1/l_e$ ,

$W = eV/kT$ ,  $p^2 = 1/D\tau$ . Here, the diffusion equation  $j = -Ddn/dx$  and the equation of continuity  $dj/dx = Ake^{-kx} - n/\tau$  were assumed to hold;  $j(x)$  is the exciton diffusion current,  $n(x)$  - exciton concentration,  $\tau$  - exciton lifetime,  $k$  - light absorption coefficient. The coefficient  $C = (I_1/I_0)(e/kT)$  may be calculated from the  $I_1/I_0(V)$  curves:

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$C = \frac{kp}{k+p} \frac{k+p+\chi}{(k+\chi)(p+\chi)} \frac{m_{-\infty}}{m_{\infty}} \frac{e}{kT}$ . From this formula it follows, e.g., for  
 $m_{-\infty}/m_{\infty} = 0.01$   $p \approx 0.15 \mu^{-1}$  and therefrom  $l_p \approx 6\mu$ , which is in good agree-  
ment with previous measurements. The effect of the field upon the  
extinction of  $Cu_2O$  luminescence may be explained both qualitatively and  
quantitatively by assuming that on the surface of the semiconductor a  
blocking inflection of the energy bands occurs. The authors thank  
Professor V. I. Lyashenko and Docent K. B. Tolpygo for their interest and  
discussions. There are 4 figures and 4 Soviet-bloc references.

ASSOCIATION: Kiyevskiy gosudarstvennyy universitet im. T. G. Shevchenko  
(Kiev State University imeni T. G. Shevchenko)

SUBMITTED: July 2, 1960

Card 5/6

30024  
S/020/61/141/001/006/021  
B104/B138

24,3500 (1138, 1395)

AUTHORS: Peka, G. P., and Karkhanin, Yu. I.

TITLE: The influence of external electric field on the luminescence of cuprous oxide

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 141, no. 1, 1961, 63 - 65

TEXT: The authors found that an external electric field perpendicular to the surface of the semiconductor influenced the infrared luminescence of cuprous oxide. The  $\text{Cu}_2\text{O}$  specimen was stuck onto a mica plate ( $\sim 50\mu$ ).

A semitransparent platinum electrode was sputtered onto the mica. A voltage of 500 to 3500 v was applied between electrode and  $\text{Cu}_2\text{O}$ .

Luminescence was excited with monochromatic light ( $\lambda = 435.8 \text{ m}\mu$ ,  $\lambda = 491.6 \text{ m}\mu$ ). The luminescence was recorded by crossed filters. Three types of specimens were studied: 1) specimens with considerable bending of the surface barrier of the bands; 2) specimens with slight barrier surface bending of the bands; and 3) specimens without any noticeable bending. Three measurements were made: 1) intensity of luminescence without electric field; 2) intensity of luminescence with electric field; Card 1/9

247700

36891

S/181/62/004/004/036/042  
B102/B104

AUTHORS: Karkhanin, Yu. I., and Peka, G. P.

TITLE: The inversion layer on  $\text{Cu}_2\text{O}$

PERIODICAL: Fizika tverdogo tela, v. 4, no. 4, 1962, 1058-1060

TEXT: The field effect was studied with poly- or monocrystalline  $\text{Cu}_2\text{O}$  specimens.  $\text{Cu}_2\text{O}$  was glued onto a  $\sim 50 \mu$  thick mica plate and a semitransparent Pt electrode was cathode-sputtered to the other side of the plate. A constant field of up to  $7 \cdot 10^5 \text{ V/cm}$  was applied between  $\text{Cu}_2\text{O}$  and Pt. Ohmic contacts of gold were applied to this specimen and the resistance was measured with a d-c bridge. The field effect determined was almost equal for mono- and polycrystalline  $\text{Cu}_2\text{O}$ . The dependence of the resistance on the surface field had a minimum at a negative potential on the  $\text{Cu}_2\text{O}$ , with growing field in  $\Delta\sigma_{\text{surf}}$  changed its sign in several cases.  $\Delta\sigma_{\text{surf}}$  depends on the surface-near band inflection

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The inversion layer on  $\text{Cu}_2\text{O}$

S/181/62/004/004/036/042  
B102/B104

$V_s: V_{s \min} = \ln(p_0/bn_0)$ ,  $b$  is the electron-to-hole mobility ratio,  $n_0$  and  $p_0$  the respective concentrations.  $p_0$  was determined from Hall-effect measurements,  $n_0$  was determined from  $n_0 = n_i^2/p_0 = (2.3 \cdot 10^3 T^3/p_0) e^{-U/kT}$ ,  $U$  being the forbidden band width (2 eV). For  $b=1$  and  $2 \cdot 10^{13} \leq p_0 \leq 2 \cdot 10^{10} \text{ cm}^{-3}$ , the minimum of  $\Delta\sigma_{\text{surf}} = f(V_s)$  is at  $V_s$  values between 52 and 41 kT/e.

This high value is ascribed to the very small electron concentration. Near the surface,  $n_0 \sim p_0$ . In some samples the field effect changed its sign at  $\sim 8 \cdot 10^4$  V/cm, and in some cases the minimum of  $\Delta\sigma_{\text{surf}} = f(V_s)$

corresponded to  $E=0$ . A similar effect was observed by S. R. Morrison (Techn. Rep. no. 2, Electr. Eng. Res. Lab. Univ., Illinois) with germanium. This anomalous behavior can be explained by assuming a strong initial blocking band inflection near the surface. The thickness of the inversion layer will be smaller than the screening depth which is

$l_{\text{sc}} = \sqrt{\epsilon kT/8\pi e^2 p_0}$ ;  $\epsilon = 7.6$ , the dielectric constant. Since  $0.5 \mu\text{m} \leq l_{\text{sc}} \leq 1 \mu\text{m}$ , the inversion layer is thinner than  $0.5 \mu\text{m}$ . Also the negative capacitor

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The inversion layer on  $\text{Cu}_2\text{O}$

S/181/62/004/004/036/042  
B102/B104

photoeffect observed at these samples is indicative of the presence of an inversion layer. It is improbable that the contact potential difference of about 1 v should cause such a strong band inflection. There is 1 figure.

ASSOCIATION: Kiyevskiy gosudarstvennyy universitet im. T. G. Shovchenko (Kiyev State University imeni T. G. Shevchenko).

SUBMITTED: January 2, 1962

Card 3/3

24.24/2

S/181/62/004/009/003/045  
B108/B186

AUTHORS: Karkhanin, Yu. I., Peka, G. P., and Yarmola, T. M.  
TITLE: Quenching of infrared luminescence of cuprous oxide by hydrogen ions

PERIODICAL: Fizika tverdogo tela, v. 4, no. 9, 1962, 2306 - 2311

TEXT: The dependence of quenching the IR luminescence of  $\text{Cu}_2\text{O}$  on the concentration of the hydrogen ions in the surrounding medium was studied. Various electrolytic solutions were placed in irradiation cells with a transparent bottom and covered with  $\text{Cu}_2\text{O}$ . The latter was irradiated with monochromatic light, whereupon luminescence intensities of dry  $\text{Cu}_2\text{O}(i_{\text{dr}})$  and of  $\text{Cu}_2\text{O}$  in contact with the electrolyte ( $i_{\text{el}}$ ) were measured. Distilled water and slightly acid solutions caused stronger quenching than solutions of salts and bases. A linear dependence of the ratio  $C = i_{\text{el}}/i_{\text{dr}}$  on the pH of the electrolyte was established. Quenching becomes less in-  
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S/181/62/004/009/013/045

B185; B186

quenching of infrared ...

tensive with increasing pH. Quenching is attributed to adsorbed hydrogen ions which owing to their small radius ( $\approx 10^{-3}$  Å) are able to produce a field which increases the depletion (barrier) bending of the bands. The acceptor levels near the surface become filled up and an increased radiationless annihilation of excitons ensues, i. e. a quenching of luminescence. Measurements of the capacitive photoeffect confirmed this mechanism of quenching. There are 5 figures.

ASSOCIATION: Kiyevskiy gosudarstvennyy universitet im. T. G. Shevchenko  
(Kiev State University imeni T. G. Shevchenko)

SUBMITTED: February 24, 1962

Card 2/2

43139

S/181/62/004/011/043/049  
B108/B186

14.2500

21.2420

AUTHORS:

Vorob'yev, Yu. V., and Karkhanin, Yu. I.

TITLE:

The effect of oxygen vacancies on the luminescence and photoconductivity of cuprous oxide

PERIODICAL:

Fizika tverdogo tela, v. 4, no. 11, 1962, 3336-3337

TEXT: The long-time component of photoconductivity and the short-wave (0.7-0.8  $\mu$ ) luminescence of  $\text{Cu}_2\text{O}$  may be related to donor-type lattice defects (oxygen vacancies) in the lower half of the forbidden band. These furnish two electrons which may constitute a center of thermal excitation in the conduction band or of recombination for a free hole. The variation of the luminescence intensity with the wavelength of the exciting light (two maxima) indicates that the centers are excited by the direct absorption of light. The oxygen vacancies with their two localized electrons have a short time of afterglow (less than  $4 \cdot 10^{-8}$  sec) similarly to the F-centers in alkali halides. The long-time photoconductivity (I. S. Gorban' et al., FTT, 3, 7, 1961) in  $\text{Cu}_2\text{O}$  specimens having short-wave

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The effect of oxygen vacancies ...

S/181/62/004/011/043/049  
B108/B186

luminescence can therefore be explained by ionized oxygen vacancies trapping free electrons and thus increasing the lifetime of the photoholes. There is 1 figure.

ASSOCIATION: Kiyevskiy gosudarstvennyy universitet im. T. G. Shevchenko  
(Kiev State University imeni T. G. Shevchenko)

SUBMITTED: July 9, 1962

Card 2/2

h-180

S/181/62/004/012/037/052  
B125/B102

AUTHORS: Peka, G. P., and Karkhanin, Yu. I.

TITLE: The influence of an electric field applied to the surface on the luminescence and electrical conductivity of cuprous oxide

PERIODICAL: Fizika tverdogo tela, v. 4, no. 12, 1962, 3618-3625

TEXT: The kinetics of the influence of an external magnetic field on the luminescence and electrical conductivity of  $\text{Cu}_2\text{O}$  specimens was studied at atmospheric pressure and at  $10^{-5}$  mm Hg, using an unbalanced bridge circuit. The specimens were freshly etched in concentrated nitric acid and in a 40 percent ammonia solution and annealed (at  $10^{-13}$  mm Hg and  $600^\circ\text{C}$ ). An IR photomultiplier of the type  $\Phi\Xi\Upsilon$ -22 (FEU-22) connected with a mirror galvanometer was used for recording the luminescence. All the examined effects of  $\text{Cu}_2\text{O}$  monocrystals and  $\text{Cu}_2\text{O}$  polycrystals were found to be identical. Fig. 1 shows the time dependence of the absolute change  $\Delta i_{\text{lum}}$  of the luminescence intensity for the case in which a field is applied.

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The influence of an electric ...

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B125/B102

The kinetics of the fading away of the luminescent effect depends on the direction in which the field is applied. If the potential applied to  $\text{Cu}_2\text{O}$  is positive, the luminescent effect becomes stationary more quickly ( $\sim 10$  to  $20$  sec) than in the case of a negative potential ( $90$  to  $120$  sec). With a negative field,  $\Delta i_{\text{lum}}$  is very small. The luminescent field effect fades out much more quickly than the ordinary field effect. Both effects follow from the variation of the conditions for the exciton annihilation. A negative potential applied to  $\text{Cu}_2\text{O}$  reduces the field-induced increment in the filling of the acceptor levels, i.e. the conditions for the exciton annihilation reduce to the conditions to which the crystal surface was subject before the field was turned on. The asymmetry of the kinetics for various directions of the applied electric field is attributed to the increase in the antibarrier curvature of the bands when the potential applied to the semiconductor is positive; also to the screening from emergence of the holes onto the surface and to the trapping of the holes on surface levels. When the potential applied to the semiconductor is negative,  $\Delta i_{\text{lum}} = f(\ln t)$  is for most of the specimens a linear function if the time interval is large enough. The dependence  $\Delta V_k = f(\ln t)$  of the change

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The influence of an electric ...

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B125/B102

$\Delta V_g$  in the curvature of the bands likewise is linear, which indicates a distribution  $g(\tau) = 1/\tau$  of the slow states over the relaxation times  $\tau$  and shows that the model developed by G. W. Pratt, H. H. Kolm (Semicond. Surf. Phys., 297) does not apply in the present case. There are 7 figures and 1 table.

ASSOCIATION: Kiyevskiy gosudarstvennyy universitet im. T. G. Shevchenko  
(Kiev State University imeni T. G. Shevchenko)

SUBMITTED: July 13, 1962

Fig. 1: The time dependence of the variation in the luminescence intensity with turned-on field (-2500 v on  $Cu_2O$ ).

Legend: (1) Freshly etched specimen, (2) specimen annealed in rough vacuum.

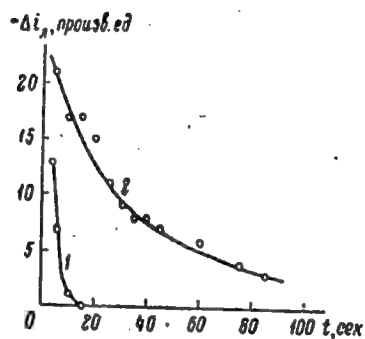
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The influence of an electric ...

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Fig. 1



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39696  
S/051/62/013/001/018/019  
E039/E420

24.3500

AUTHORS: Karkhanin, Yu.I., Vorob'yev, Yu.V.

TITLE: On the relaxation time of the short wavelength luminescence bands of  $\text{Cu}_2\text{O}$

PERIODICAL: Optika i spektroskopiya, v.13, no.1, 1962, 148

TEXT: Luminescence was excited by a pulsed light source (quartz high pressure xenon lamp). A condenser (0.05  $\mu\text{F}$ , 4 kV) was discharged through the lamp giving a pulse of duration 1.5  $\mu\text{sec}$  with a rise time of 0.4  $\mu\text{sec}$  and a repetition frequency of 50 c/s. The red and infrared part of the spectrum was absorbed in a saturated salt solution filter 200 mm thick plus a CSC-17 (SZS-17) filter. Detection of luminescence was by means of a ФЭУ-22 (FEU-22) photomultiplier with a УФС-3 (UFS-3) filter. Times of relaxation  $\tau$  were measured by Tolstoy and Feofilov's taameter method which in this case had a limiting sensitivity of  $4 \times 10^{-8}$  sec. At the temperature of liquid oxygen  $\tau$  is below this limit and remains so as the temperature is increased to  $-130^\circ\text{C}$  while the intensity of luminescence falls quickly. At temperatures from

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\* taameter

On the relaxation time ...

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E039/E420

-183 up to +20°C,  $\tau$  increases from  $6 \times 10^{-8}$  to  $5 \times 10^{-7}$  sec as in N. A. Tolstoy's work. These results show that the relaxation time for short wavelength luminescences is less than for infrared.

SUBMITTED: March 5, 1962

Card 2/2

VOROB'YEV, Yu.V., [Vorobiov, IU.V.]; KARKHANIN, Yu.I.

Kinetics of the infrared luminescence of copper oxide. Ukr.  
fiz. zhur. 8 no.7:801-803 J1 '63. (MIRA 16:8)

1. Kiyevskiy gosudarstvennyy universitet im. Shevchenko.  
(Copper oxide) (Luminescence)

VOROB'YEV, Yu.V.; KARKHANIN, Yu.I.

Mechanism of the excitation of luminescence of cuprous oxide  
in the region of impurity absorption. Opt. i spektr. 15  
no.3:389-393 S '63. (MIRA 16:10)

KARKHANIN, Yu.I.; VOROB'YEV, Yu.V.

Mechanism and kinetics of the electroluminescence of silver oxide. Dokl. AN SSSR 152 no.4:855-857 O '63. (MIRA 16:11)

1. Kiyevskiy gosudarstvennyy universitet im. T.G. Shevchenko.  
Predstavleno akademikom A.N. Tereninym.

L 17119-62 EEC(b)-2/EWT(1) AS(mp)-2/AFWL/ESD(gs)/ESD(t)/IJP(8)

ACCESSION NR: AP5000845

S/0181/64/006/012/3515/3523

AUTHOR: Zinets, O. S.; Peka, G. P.; Karkhanin, Yu. I.

TITLE: Some questions in the theory of the luminescent field effect

SOURCE: Fizika tverdogo tela, v. 6, no. 12, 1964, 3515-3523

TOPIC TAGS: field effect, luminescence, exciton, semiconductor impurity, electron motion, cuprous oxide

ABSTRACT: The theory of the luminescence produced in a semiconductor by an electric field applied to the surface is analyzed under the assumption that the luminescence has an exciton mechanism. The semiconductor is assumed to have only one type of impurity center, on which radiative annihilation of the excitons takes place. A diffusion mechanism is assumed for the motion of the electrons. The interaction between the excitons and the surface of the semiconductor is described by means of an exciton-annihilation surface rate that depends on the filling of the surface electronic state, and consequently also on the surface bending of the bands. The relative change in intensity of luminescence as a

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ACCESSION NR: AP5000845

function of the bending of the bands and of the coefficient of light absorption is calculated. The obtained results explain the experimentally observed luminescence field effect in cuprous oxide. From a comparison of the theoretical and experimental values of the luminescence effect for this material, the length of diffusion displacement of the excitons is estimated to be  $\sim 1$  and  $\sim 40$  (for different samples), and the rate of the surface annihilation of the excitons is estimated at  $\sim 10^5$  cm/sec. It is found that the probability of the radiative annihilation of the excitons by non-ionized acceptor centers is larger than or of the same order of magnitude as the annihilation of excitons by ionized acceptor centers. The effect of inhomogeneous electric fields on the diffusion of the excitons, which is of importance at low temperatures, is neglected. Orig. art. has: 2 figures, 32 formulas, and 2 tables.

ASSOCIATION: Kiyevskiy gosudarstvennyy universitet im. G. T. Shevchenko (Kiev State University)

SUBMITTED: 04May84

ENCL: 00

SUB CODE: SS, OP

NR REF SOV: 010

OTHER: 001

Cord 2/2



VOROB'YEV, Yu.V.; KARKHANIN, Yu.I.

Photoconductivity of  $\text{Cu}_2\text{O}$  in the temperature range  $+20^\circ \rightarrow +150^\circ\text{C}$ .  
Fiz. tver. tela 7 no.6:1865-1870 Je '65.

(MIRA 18:6)

1. Kiyevskiy gosudarstvennyy universitet imeni Shevchenko.

L 2515-66 EWT(1)/EWT(m)/EWP(j)/T IJP(c) GG/RM  
 ACCESSION NR: AP5014593 44.55 UR/0181/65/007/006/1865/1870  
 AUTHOR: Vorob'yev, Yu. V.; Karkhanin, Yu. I. 44.55 58  
 TITLE: Investigation of the photoconductivity of cuprous oxide in the temperature 52  
 interval +20 — +1500 21.44.55 8  
 SOURCE: Fizika tverdogo tela, v. 7, no. 6, 1965, 1865-1870  
 TOPIC TAGS: photoconductivity, cuprous oxide, crystal lattice defect, electron capture  
 ABSTRACT: In view of certain contradictions in the published explanations of the nature of photoconductivity of cuprous oxide, the authors investigated the action of various factors that changed the concentration of the complexes (changes in temperature and illumination) on the low-inertia photoconductivity (with time constant  $< 10^{-4}$  sec), and the influence of prolonged illumination on the conductivity of cuprous oxide. The photoconductivity was excited with short light pulses ( $\sim 1.5 \mu\text{sec}$ ,  $\lambda = 0.7 - 0.8 \mu$ ). In the  $20 < T < 700$  range, only the electronic was observed, but at  $T > 700$  a hole component appeared, exponentially damped with a proper time on the order of  $10^{-4}$  sec. The yield of this component increased  
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L 2515-66

ACCESSION NR: AP5014593

6

rapidly with increasing temperature. The hole component, like the electronic component, was found to be sensitive to constant illumination, and the increase in the sample conductivity upon illumination was accompanied by an appreciable decrease of photocurrent yield. These results are related to processes of association and dissociation of complexes of defects of the crystal lattice. It is indicated that complexes of Cu vacancies participate in the photoconductivity of  $Cu_2O$  by serving as metastable traps when  $T > 1000$ . The cross sections for the capture of electrons by the Cu vacancies and by their complexes are estimated. "The authors thank O. S. Zinets for a valuable discussion". Orig. art. has: 7 formulas and 3 figures.

ASSOCIATION: Kiyevskiy gosudarstvennyy universitet im. T. G. Shevchenko (Kiev State University) 4485

SUBMITTED: 04 May 64

ENCL: 00

SUB CODE: 88,OP

NR REF SOV: 008

OTHER: 007

*(Signature)*

Card

2/2

L 9577-66 EWT(1)/EWT(m)/EWP(t)/EWP(b) IJP(c) JD/AT

ACC NR: AP5027445

SOURCE CODE: UR/0181/65/007/011/3451/3452

AUTHOR: <sup>44,55</sup> Karkhanin, Yu. I.; <sup>44,55</sup> Tretyak, O. V. 59  
BORG: <sup>44,55</sup> Kiev State University im. T. G. Shevchenko (Kiyevskiy gosudarstvennyy universitet)

TITLE: Photocurrent oscillations in high-resistance GaAs

SOURCE: Fizika tverdogo tela, v. 7, no. 11, 1965, 3451-3452

TOPIC TAGS: gallium arsenide, <sup>21, 44,55</sup> photoconductivity

ABSTRACT: Low-frequency electrical oscillations are observed when high-impedance specimens of gallium arsenide are illuminated by monochromatic light in the  $1.2 \mu$  region. These oscillations arise at several critical temperatures and applied potential differences. The curve for photoconductivity as a function of wavelength shows three clearly expressed maxima at energy levels of approximately 1.4, 1.02 and 0.75 ev. The first maximum is probably due to interband transitions, while the other two are apparently caused by oxygen impurities in the specimens. Current voltage curves show a clearly expressed region of negative resistance. Low-frequency photocurrent oscillations are always observed in this region. The frequency of these oscillations at a temperature of  $-90^{\circ}\text{C}$  is 17 cps. A typical oscillogram of the oscillations is given. When the temperature is reduced to  $-100^{\circ}\text{C}$ , the oscillations become strongly

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ACC NR: AP5027445

asymmetric and the frequency drops to 0.2-5 cps. The frequency of the oscillations increases with the wavelength of the incident light in the negative resistance region. The threshold voltage for the oscillations increases with temperature. These oscillations are apparently due to two types of centers with different relaxation times. Orig. art. has: 2 figures. 0

SUB CODE: 20/

SUBM DATE: 14Jun65/

ORIG REF: 002/

OTH REF: 000

Card 2/2pw

*KTB 3/10/70 NP. A.V.*  
MORGULIS, N.D.; KARKHANINA, N.Ya.

Some optical characteristics of antimony-cesium photocathodes.  
Nauk. zap. Kiev. un. 9 no.2:5-15 '50. (MLRA 9:12)

(Photoelectric cells)

KARKHANINA, N. YA.

537.312.5

7247. Some optical properties of antimony-caesium photocathodes. N. YA. KARKHANINA AND N. D. MOROZUKA. *I. Tech. Phys., USSR*, 20, 343-52 (March, 1950) in Russian.

The authors used a method previously developed by them, viz. that of a Sb-Cs wedge. The programme of the investigations was the determination of the coefficients of refraction and absorption; the direct and inverse photo-effect along the wedge on glass and Pt-supports for various wavelengths. It was shown that the distribution of the effect along the wedge is determined by the energy distribution of the optical wave at a depth  $0 < d < 15 \mu$  below the surface; the orders of magnitude of the paths of the photo-electrons within the cathode, their energy losses, etc., were also determined. The possible influence of inhomogeneities of the structure on the oscillations of the direct photo-current along the wedge, which had been established, was investigated by taking spectral curves of the direct effect at different points of the wedge.

B. F. KRAUS

KARKHANINA, Neonila Yakovlevna; POLYANSKAYA, L.O. [Polians'ka, L.O.],  
red.; MATUSEVICH, S.M. [Matusevych, S.M.], tekhn. red.

[Technology of semiconducting materials] Tekhnologiya napivprovidny-  
kovykh materialiv. Kyiv, Derzh. vyd-vo tekhn. lit-ry, 1961. 326 p.  
(MIRA 14:11)

(Semiconductors)



KARKHANOV, A.A. [author]; PISKUNOV, V.Ya., inzhener [reviewer].

A book with serious shortcomings: "Bulldozer operations." A.A.Karkhanov.  
Reviewed by V.IA.Piskunov. Mekh.trud.rab. 7 no.8:47 Ag '53. (MLRA 6:8)  
(Bulldozers) (Karkhanov, A.A.)



KARKHIN, G.

137-1958-1-264

Translation from: Referativnyy zhurnal Metallurgiya. 1958 Nr 1, p 40 (USSR)

AUTHOR: Karkhin, G.

TITLE: Iron and Steel in the German Federal Republic (Chernaya metallurgiya FRG)

PERIODICAL: Prom.-ekon. gaz., 1957, 31 iyulya. Nr 91, p 4

ABSTRACT: The high rate of capital investment in the iron and steel industry of the German Federal Republic, particularly in the last few years, is noted. Thus, in 1948/1951 it was 1 billion DM and in 1952/1956 5 billion DM. In 1956 17.6 million tons of pig iron, 23.2 of steel and 15.6 of rolled products were made. In operation in 1956 were 111 of 123 blast furnaces, 51 basic Bessemer (Thomas) converters, 3 Bessemers, 184 open hearths, 69 electric steel, and 43 crucible steel furnaces. Basic Bessemer steel was 42% of the total, and electric steel 5%.  $O_2$  is used in the basic Bessemer and open-hearth operations. In 1956 three electric furnaces, of 70 t to 120 t capacity each, with electromagnetic agitation of the metal, were placed in operation. The foundry industry is well developed, particularly pressure casting, skin dry sand casting and vacuum casting. A few mills are introducing continuous pouring of steel.

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137-1958-1-264

Iron and Steel in the German Federal Republic

A tendency to introduce mass-production methods into the rolling mills may be observed. The output of small rolled shapes has particularly increased in the past two years. In 1956 and 1957 the major emphasis in capital expansion has gone not to rolling mills, but to iron and steel capacity. An increase in steel output of up to 28-30 million tons by 1960 is envisaged. In 1956 18 million t of Fe ore were imported; this represented 30% of the total import of Fe ore by the entire capitalist world. The import of hard coal and scrap metal is also increasing. The most far-sighted industrialists of the German Federal Republic are speaking out for expansion of business relations with the USSR and the lands of people's democracy.

A.P.

1. Iron industry--Germany
2. Steel industry--Germany

Card 2/2

KARKHIN, G. I.

KAPELINSKIY, Yu.N.; POLYANIN, D.V.; MENZHINSKIY, Ye.A.; IVANOV, I.D.;  
 SERGEYEV, Yu.A.; KOSTYUKHIN, D.I.; DUDUKIN, A.N.; IVANOV, A.S.;  
 PINOGENOV, V.P.; ZAKHMATOV, M.I.; SOLODKIN, R.G.; DUSHEN'KIN, V.N.;  
 BOGDANOV, O.S.; SEROVA, L.V.; GONCHAROV, A.N.; KARKHIN, G.I.;  
 LYUBSKIY, M.S.; PUCHIK, Ye.P.; SEROVA, L.V.; KAMENSKIY, N.N.;  
 SABEL'NIKOV, L.V.; FEDOROV, B.A.; GERCHIKOVA, I.N.; KARAVAYEV, A.P.;  
 KARPOV, L.N.; SHIPOV, Yu.P.; VLADIMIRSKIY, L.A.; KUTSENKOV, A.A.;  
 RYABININA, E.D.; ANAN'YEV, P.G.; ROGOV, V.V.; BELOSHAPKIN, D.K.;  
 SEYFUL'MULYUKOV, A.M.; PARFENOV, A.Ya.; SMIRNOV, V.P.; ALEKSEYEV,  
 A.F.; SHIL'DKROT, V.A.; CHURAKOV, V.P.; BORISENKO, A.P.; ISUPOV, V.T.;  
 ORLOVA, N.V., red.; GORYUNOVA, V.P., red.; BELOSHAPKIN, D.K., red.;  
 GEORGIYEV, Ye.S., red.; KOSAREV, Ye.A., red.; KOSTYUKHIN, D.I., red.;  
 MAYOROV, B.V., red.; PANKIN, M.S., red.; PICHUGIN, B.M., red.;  
 POLYANIN, D.V., red.; SOLODKIN, R.G., red.; UFIMOV, I.S., red.;  
 EKHN, P., red.; SMIRNOV, G., tekhn.red.

[Economy of capitalist countries in 1957] Ekonomika kapitalisti-  
 cheskikh strah v 1957 godu. Pod red. N.V.Orlova, IU.N.Kapelinskogo  
 i V.P.Goriunova. Moskva, Izd-vo sotsial'no-ekon.lit-ry, 1958.  
 686 p. (MIRA 12:2)

1. Moscow. Nauchno-issledovatel'skiy kon'yunktturnyy institut.  
 (Economic conditions)

KARKHIN, G.

Signing of agreements between the USSR and West Germany. Vnesh.  
torg. 28 no.5:37-38 '58. (MIRA 11:6)  
(Russia—Commerce—Germany, West) (Germany, West—Commerce—Russia)

ZENIN, N.A., inzh.; KARKHINA, A.Ya., inzh.; DOROSHENKO, V.Ya., inzh.

Production of oil meal for reprocessing in the affiliated extraction plants. Masl.-zhir.prom. 28 no.9:28-29 S '62. (MIRA 15:9)

1. Belorechenskiy maslozavod.

(Oils and fats)

*KARKHOV, A.A.*

IVANOV, A.T., inzh.; KARKHOV, A.A., inzh.

Scoop-type bulldozer blade. Mekh.stroi. 14 no.6:11-12 Jc '57.  
(MIRA 10:11)

(Bulldozers)



ACCESSION NR: AT4025304

S/0000/63/000/000/0145/0153

AUTHORS: Karkhov, A. N.; Karpukhin, V. T.

TITLE: Thermal radiation of a plasma contained in a chamber with reflecting walls

SOURCE: Diagnostika plazmy\* (Plasma diagnostics); sb. statey. 0  
Moscow, Gosatomizdat, 1963, 145-153 |

TOPIC TAGS: plasma containment, plasma temperature, cavity resonator, discharge plasma, plasma magnetic field interaction, plasma electron density, plasma electron temperature |

ABSTRACT: A procedure is outlined for determining the temperature of plasma electrons from the quality factor  $Q$  of the metal vacuum chamber used for the experiments, which is treated in this case as a cavity resonator. The formulas derived on this basis were used to determine the temperature of the electrons in the positive column of

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ACCESSION NR: AT4025304

a discharge with incandescent cathode in a homogeneous magnetic field in a copper chamber, with the radiation frequency (9350 Mcs polarized parallel to the external magnetic field) measured by a superheterodyne receiver. The electron density was measured with an interferometer at a wavelength of 8 mm. In addition, the electron temperature was determined with a probe. The Q of the vacuum chamber was determined with a noise generator. The experimental results show that the electron temperature cannot be determined from the black-body temperature, and also that at currents above 2 amperes and magnetic fields above 600-700 Oe the radiation power of the plasma increases strongly and cannot be regarded as thermal radiation. The reasons for this are not yet clear. Orig. art. has: 4 figures, 9 formulas, and 1 table.

ASSOCIATION: None

SUBMITTED: 19Oct63

DATE ACQ: 16Apr64

ENCL: 02

SUB CODE: ME

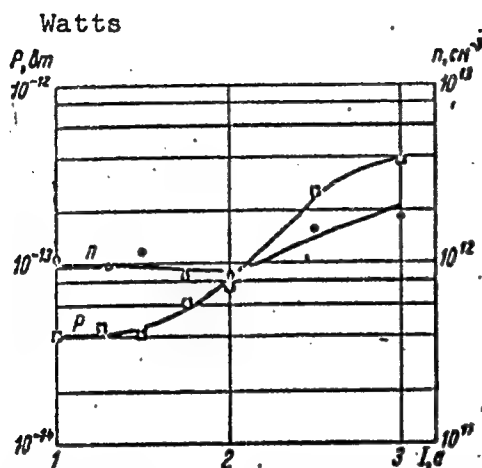
NR REF SOV: 007

OTHER: 003

Card 2/4

ACCESSION NR: AT4025304

ENCLOSURE: 01



Dependence of the power  $P$  registered by the receiver and of the electron density  $n$  on the discharge current  $I$  (argon press. 0.0008 mm Hg, mag. field 650 Oe)

Card 3/4

1.10697-65 KPF(n)-2/EPA(w)-2/EWT(1)/EWT(m)/EWG(m)/EWA(m)-2 Po-4/Pi-4/Pz-6/Pab-10

IJP(c) AT/WW

ACCESSION NR: AT5006201

8/3138/64/000/676/0001/0115

AUTHOR: Artemenkov, I. I.; Bogdanov, G. F.; Golovin, I. N.; Karkhov, A. N.;  
Kozlov, P. I.; Kuznetsov, V. V.; Kucheryayev, Yu. A.; Panov, D. A.; Piatunovich,  
V. I.; Semashko, N. N.; Timofeyev, A. P.

TITLE: Production of hot thermonuclear plasma by the method of injection of fast particles into a magnetic trap

SOURCE: Moscow. Institut atomnoy energii. Doklady, no. 676, 1964. O poluchenii goryachey termoyadernoy plazmy metodom inzhetsii bystrykh chashtits v magnitnyu lovushku, 1-115

TOPIC TAGS: hot plasma, thermonuclear reaction, magnetic trap, magnetic mirror, plasma injection, plasma density, flute instability, cyclotron instability

ABSTRACT: The article deals with the possibility of accumulating dense hot plasma in a magnetic trap with mirrors upon injection of fast molecular ions and neutral atoms. Experiments carried out with the Ogra installation on the accumulation of plasma in the dissociation of molecular ions by residual gas and in a lithium arc are described. The experiments have shown that the radial electric field hinders

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L 40697-65

ACCESSION NR: AT5006201

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greatly the development of flute instability, the suppression of which is the most important condition for the successful accumulation of plasma in magnetic traps. In the presence of a sufficiently strong radial field, produced by the space charge of the plasma, the time for all the non-gas losses, due to all types of instability and to the non-adiabatic ion motion, exceeds 10 milliseconds. In dissociation by residual gas, a hot plasma with density  $10^8$  ion/cm<sup>3</sup> was obtained, and the only ion losses from the trap were due to charge exchange. It is pointed out that there are no principal physical obstacles to further increase in plasma density in all axially symmetrical magnetic traps such as Ogra. The major deduction drawn from the analysis of all the available data is that plasma stabilization can be effected using only the internal electric fields of the plasma. The section headings are: I. Introduction. 1.1 Principal problems in plasma confinement in magnetic traps. 1.2. Nonadiabatic losses, charge exchange, instabilities. 1.3. Flute instability. 1.4. Cyclotron and other kinetic instabilities. 1.5. Role of the method of plasma production. 1.6. Prospects of realizing a thermonuclear reaction with injection of fast atoms in a trap with magnetic mirrors. 1.7. Kinetics of plasma accumulation in Ogra I and Ogra II. II. Latest results of experiments with Ogra I. 2.1. Conditions of experiments and measuring apparatus in Ogra I. 2.2. Flute instability of plasma. 2.3. Suppression of flute instability with electric fields. 2.4.

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L 40697-65

ACCESSION NR: AT5006201

Ion losses from the magnetic trap and plasma density. 2.5. Plasma potential. Loss of electrons from trap. 2.6. Cyclotron instability. 2.7. Ways of increasing plasma density in Ogra I. III. Conclusion. Orig. art. has: 36 figures, 32 formulas, and 4 tables.

ASSOCIATION: Institut atomnoy energii im. I. V. Kurchatova (Institute of Atomic Energy)

SUBMITTED: 00

ENCL: 00

SUB CODE: MS

NR REF SOV: 029

OTHER: 025

Card 3/3 *mb*

BOGDANOV, G.F.; KARKHOV, A.N.; KUCHERYAYEV, Yu.A.

Dissociation of fast molecular hydrogen ions and the charge  
exchange of fast protons in a lithium arc. Atom. energ. 19  
no.4:381. O '65. (MIRA 18:11)

KARKHOV, A.N.

Spectrum frequency analyzer for studying the cyclotron radiation  
of hydrogen ions. Prib.i tekhn.eksp. 6 no.5:115-118 S-0 '61.  
(MIRA 14:10)  
(Ions—Spectra) (Cyclotron) (Electronic differential analyzers)



1ST AND 2ND ORDERS		PROCESSING AND PROPERTIES INDEX		3RD AND 4TH ORDERS	
<p><b>Gasification of small-grained coal in a "bubbling" layer using an oxy-steam blow.</b> N.V. Karkhov. <i>Kisloved</i> 1944, No. 2, 12-21. The "bubbling" layer method of gasification consists of passing the blow gas upwards through the bed of the coal. The upward streaming gas creates a turbulence resembling boiling. Expts. on gasification of small-grained bituminous coal using oxy-steam (a mixt. of steam and O-enriched air) were carried out in a specially built generator having a capacity of 2000-3000 cu. m. of gas per hr. The coal was fed by 3 endless screw feeders installed 1.4 m. above the grate. An air-O mixt. was supplied through nozzles 2.5-4 m. above the grate (i.e. above the fuel bed) to complete combustion of any solid fines carried by the gas. The temp. of the draw-off generator gas was 1000-1100°. Of the ash, 70-75% was carried out from the generator by the gas; the rest was removed by a continuous mech. device. The compn. of the generated gas was aimed to be in a ratio of (CO + H<sub>2</sub>): N of 3.2-3.3. The vol. compn. of the blow was O 23-24, N 19-20, and steam 50-58%. The generated gas was used for synthesizing NH<sub>3</sub>. For 1000 cu. m. of generated gas there were used 0.47-0.5 tons of coal contg. approx. 10% moisture, 180-190 cu. m. of 98% O, 230 cu. m. of air, and 280-300 kg. of steam. The CO + H content of the generated gas depended entirely on the O content in the blow. As the O increased the N content declined sharply</p>					
<p>at the same time the CO<sub>2</sub> content rose slightly and then remained const. The use of small-grained coal is preferable to lumps. The kind of coal preferred is the geologically young. The described method using oxy-steam permits a continuous generation of a gas suitable for synthesis. The calorific value of the gas is 2200-2400 kcal. per cu. m. The efficiency coeff. of this generator is 15-20% above that of water-gas generators. The drawbacks are the necessity of drying the coal to a moisture content not exceeding 10-15%, and the necessity of scrubbing the gas free of dust. M. Huse</p>					
<p>ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION</p>					
<p>1950M SYMBOLISM</p>					
<p>1950M SYMBOLISM</p>					

1ST AND 2ND ORDERS										3RD AND 4TH ORDERS									
PROCESSING AND PROPERTIES INDEX																			
<p><i>3a</i></p> <p><b>Ganification of metallurgical coke with oxygen enriched blast.</b> N. V. Kazhkov, <i>Kislovodsk 1944</i>, No. 4, 51-62. Expts. were made on the production of a semi water gas having a ratio of <math>\text{CO} + \text{H}_2</math> to <math>\text{N}_2</math> of 4.2:3.3 by using an O-enriched blast in an industrial automatic gas generator. Oxygen concn. in the blast required to produce the desired <math>(\text{CO} + \text{H}_2) : \text{N}_2</math> ratio was approx. 50%. As the quantity of O in the blast increased, the coeff. of steam decompn. decreased sharply, but the quantity of steam decompn. per cu. m. of O somewhat increased. This is taken to indicate that as the concn. of steam increased, the reaction <math>\text{C} + \text{H}_2\text{O} \rightarrow \text{CO} + 2\text{H}</math> was favored. CO content of the gas is greater when the blast is enriched with O; the increase of H in the generated gas is greater than that of CO. This is taken to indicate that the presence of excess steam (increasing as O increases) promotes the reaction <math>\text{CO} + \text{H}_2\text{O} \rightarrow \text{CO}_2 + 2\text{H}</math>. The quantities of O and steam needed to generate 1000 cu. m. of gas increased as the concn. of O in the blast increased. The quantity of coke required increased slightly, but in view of the richer gas, the quantity of coke consumed decreased. The following economies were effected by using an O-enriched blow: coke 25-30, steam 40-50, elec. power (exclusive of power for producing O) 30-40, and feed water 30%. The process was changed from an intermittent to a continuous one. M. Hosh.</p>																			
<p>ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION</p>																			
FROM SYMBLIV										FROM SYMBLIV									
120000 111 011 011										120000 111 011 011									
120000 111 011 011										120000 111 011 011									

KAZARNOVSKIY, Ya.S.; KARKHOV, N.V.

High-temperature conversion of gaseous hydrocarbons. Biul. tekhn.-  
ekon. inform. no.8:12-14 '58. (MIRA 11:10)  
(Hydrocarbons)

KABANOV, F.I., KOSAROV, K.Y., *Plasma Chemistry*, 1971, No. 1, p. 111.

Production of nitrogen:  $N_2$  +  $e^-$  →  $N_2^+$  +  $e^-$ . Temperature  
Vapor oxygen conversion is 20% at 1000 K. Under increased  
pressure,  $\alpha$  (m. prod.) 41 m. 1. 5% at 1000 K.

1100 (P. 1)

KAZARNOVSKIY, Ya.S.; KARKHOV, N.V.; KABANOV, F.I.; OVCHARENKO, B.G.

Production of synthesis gas by high temperature conversion of  
hydrocarbon gases at high pressure. Khim.prom. no.6:396-404, Jo  
'62. (MIRA 15:11)  
(Hydrocarbons) (Water gas)

KABANOV, F.I.; KARKHOV, N.V.; KAZARNOVSKIY, Ya.S.; OVCHARENKO, B.G.;  
Prinimal uchastiye: ZUYEV, V.I.

Production of process gas by the high temperature conversion  
of natural gas at elevated pressure. Khim.prom. no.9:547-555  
Ag '62. (MIRA 15:9)

(Gas, Natural)  
(Gas manufacture and works)

VOSKOBOYNIK, N.I.; KARKHU, A.I.

Recording of resistivity curves on a large scale by large-size  
sondes. Razved. 1 prom. geofiz. no.37:83-90 '60.

(Oil well logging, Electric)

(MIRA 14:3)

KARKIN, N. I.

21671 KARKIN, N. I. Ustoychivost' raznykh konstruktsey. Trudy Mosk. elektromekhan. in-ta inzhenerov zh.-d. 'transporta in. Dzerzhinskogo, vyp. 57, 1949, s. 177-209.

SO: Letopis' Zhurnal'nykh Statey, No. 29, Moskva, 1949



SAUKA, Ya.Ya.; KARKLIN, A.Yu.

Precision lattice parameters and thermal expansion coefficients for  
Co[Hg(SeCN)<sub>4</sub>] crystals. Kristallografiia 6 no.5:775-777 S-0 '61.  
(MIRA 14:10)

1. Rizhskiy politekhnicheskii institut.  
(Cobalt compounds) (Crystal lattices)

RYABOV, Petr Ivanovich; KARELIN, K.M., red.; VORONIN, K.P., tekhn.red.

[Mobile steam boilers] Peredvizhnye parovye kotly. Izd.2..  
perer. Moskva, Gos.energ.izd-vo, 1960. 334 p. (MIRA 13:5)  
(Boilers)

LEVASHEVA, Zinaida Petrovna; ~~KARKLIN~~ P.I., polkovnik i/s, redaktor;  
KHOVANSKIY, I.P., ~~tekhnicheskii~~ redaktor

[Preserve and strengthen the glorious military tradition of the Soviet army and navy; a brief recommended reading list] Berezhno khranit' i umnozhat' slavye boevye traditsii Sovetskoi Armii i Voenno-Morskogo Flota; kratkii rekomendatel'nyi ukazatel' literatury. Moskva, 1954. 53 p. (MLRA 9:10)

1. Moscow. Publichnaya biblioteka. Voenennyi otdel.  
(Bibliography--Russia--Armed Forces)

LEVASHEVA, Z.P.; SINITSINA, K.V.; KARKLIN, P.I., red.

[Bibliography of Soviet military bibliography; a classified list of bibliographies published from 1948 to 1957] Bibliografiia sovetskoi voennoi bibliografii; sistematicheskii perechen' bibliograficheskikh ukazatelei za 1948-1957 gg. Moskva, 1959. 92 p.  
(MIRA 13:8)

1. Moscow. Publichnaya biblioteka. Voennoy otel.  
(Bibliography--Military art and science)  
(Bibliography--Russia--History, Military)